2021

ROAD SAFETY AUDIT

HIGH STREET FROM MAIN STREET (ROUTE 27) TO
POWDER MILL ROAD (ROUTE 62)

ACTON, MA

MAY 18, 2021

Prepared For:
Town of Acton

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Background

This report summarizes results from the Road Safety Audit (RSA) in the High Street corridor between Main Street and Powder Mill Road (Route 62) in Acton, Massachusetts. The summary includes feedback from the multidisciplinary team of participants during the RSA that was conducted on January 11, 2021 as well as feedback from a virtual public forum conducted on March 4, 2021. The RSA process included a review of existing conditions, leading a virtual field visit with various stakeholders as a part of the audit team, and facilitating a public meeting with Town citizens.

An RSA is conduced to identify safety issues and provide potential enhancements to improve safety for all roadway users. The potential enhancements are categorized by timeframe and cost, which helps maintaining agencies to determine jurisdictional responsibilities and a preliminary timeline for the implementation of proposed enhancements. Typically, RSAs involve a pre-audit meeting and a field review that includes the entire audit team; however, the process was modified to a virtual format to account for social distancing guidelines during the COVID-19 pandemic. In addition to an RSA, the Town wanted to ensure that public input on existing challenges was recorded and used to inform the nature and location of recommendations developed as part of the RSA.

The High Street corridor was chosen as an RSA location because of its collision history, unique topography, its proximity to residential, commercial, and recreational land uses, and because this street serves as a popular connection between Acton and Concord.

Project Location

The project location is a 2-mile segment of High Street between Main Street and Powder Mill Road (**Figure 1**). High Street is primarily residential between Main Street and Old High Street and becomes commercial on approach to Powder Mill Road with businesses on both sides of the street. High Street is classified as an urban collector street and provides access between Downtown Acton near Main Street and Concord at the terminus of the corridor on Powder Mill Road. The South Acton commuter rail station (travelling on the Fitchburg Line to Boston) is across the High Street and Main Street intersection. The street functions as one lane in each direction with a centerline provided throughout the segment. The roadway width ranges from 25 to 30 feet. The posted speed limit of the corridor is 25 mph from Main Street (Route 27) to Conant Street, and 30 mph south of Conant Street. A speed study completed by the Town in 2018 shows an 85th percentile speed of up to 48 mph in some locations such as the Parker Street intersection[1].

Sidewalk is currently provided on the east side of High Street between Parker Street and Powder Mill Road, with the remaining segment planned to be completed soon. Curb ramps are provided where crosswalks exist, but they are not ADA-compliant. Crosswalks are located in two locations across High Street: Parker Street and Powder Mill Road. Additionally, there are crosswalks across Main Street and Powder Mill Road near High Street, and along Audobon Drive, Parker Street, and Dunham Lane through the corridor. There are no dedicated bicycle facilities and transit routes along the corridor. Parking is prohibited on High Street as many residents have garages and driveways, and businesses have off-street parking lots. All intersections in the corridor are unsignalized except for the intersection of High Street and Powder Mill Road.

[1]Acton Engineering Department, 2018

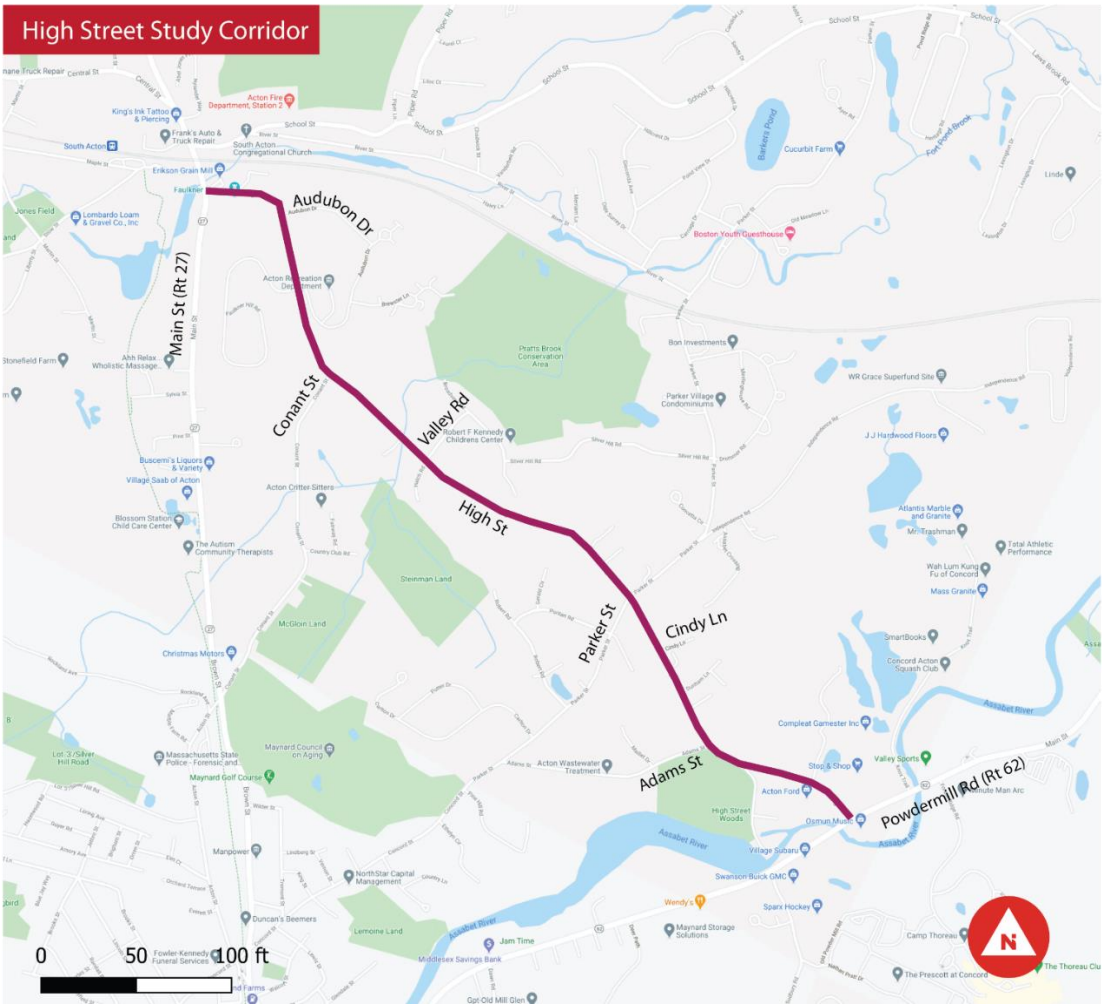

Figure 1: High Street RSA Study corridor

Specific descriptions of the major intersections within the study area are provided below:

- **High Street at Main Street (Route 27)**: High Street at Main Street (see **Figure 2**) is a three-legged unsignalized intersection located at the northern end of the RSA study area. Main Street is classified as an Urban Minor Arterial. High Street is STOP-controlled at this intersection and Main Street is uncontrolled.
  The Main Street southbound approach has one through lane and one left-turn lane. The northbound approach has just one shared through/right-turn lane. Shoulders are provided on Main Street south of High Street with shared lane markings provided north of Main Street. There are sidewalks on west side of Main Street south of High Street and on both sides of Main Street south of

Figure 2: High Street at Main Street

High Street. There is a crosswalk on the northern leg of the intersection however, the curb ramps are provided are not ADA-compliant.

- **High Street at Faulkner Hill Road and Audubon Drive**: The intersection of High Street at Faulkner Hill Road and Audubon Drive is a four-legged unsignalized intersection (see **Figure 3**). Audubon Drive is a local STOP-controlled two-lane roadway consisting of one lane in each direction that meets High Street from the east. Faulkner Hill Road is a local uncontrolled two-lane roadway consisting of one lane in each direction that meets High Street from the west. Crosswalks are provided across Audubon Drive and though not ADA-compliant, curb ramps are provided at either end of the crosswalk.

Figure 3: High Street at Faulkner Hill Road and Audubon Drive

- **High Street at Conant Street**: The intersection of High Street at Conant Street is a three-legged unsignalized intersection (see **Figure 4**). Conant Street is a local STOP-controlled two-lane roadway consisting of one lane in each direction that meets High Street from the southwest. There is no sidewalk on Conant Street and no crosswalks provided for pedestrians. Guardrails are provided southeast of the intersection.

Figure 4: High Street at Conant Street

- **High Street at Hatch Road and Valley Road**: The intersection of Main Street at Hatch Road and Valley Road (see **Figure 5**) is a four-legged intersection, with Valley Road meeting High Street from the southwest and Hatch Road meeting High Street from the northeast. Both side streets are STOP-controlled on approach to High Street. There are no crosswalks or sidewalk along this intersection.

Figure 5: High Street at Hatch Road and Valley Road

- **High Street at Parker Street**: The intersection of High Street and Parker Street (see **Figure 6**) is a four-legged unsignalized intersection. Parker Street is classified as an Urban Collector with one lane provided for each direction and a marked centerline. Parker Street is STOP-controlled on approach to High Street from both sides of the street. The eastbound approach of Parker Street including a turning island for eastbound right turns to High Street. Sidewalk is provided on the east side Parker Street and a crosswalk is provided across High Street at midblock just south of the intersection. Sidewalk ramps down to the crosswalk but the ramps are not ADA-compliant.

Figure 6: High Street at Parker Street

- **High Street at Adams Street**: The intersection of High Street and Adams Street (see **Figure 7**) is a three-legged unsignalized intersection, with Adams Street meeting High Street from the southwest. Adams Street is STOP-controlled local street with one lane provided for each direction and a marked centerline. There are no sidewalks along Adams Street and no crosswalks are provided at this intersection.

Figure 7: High Street at Adams Street

- **High Street at Old High Street**: The intersection of High Street and Old High Street (see **Figure 8**) is a three-legged unsignalized intersection, with Old High Street meeting High Street from the south. Old High Street is a local street with one lane provided for each direction. It connects to the back entrance of commercial businesses at the southern end of study corridor. A turning island is provided on Old High Street for northbound right turns to High Street. There are no sidewalks along Adams Street and no crosswalks are provided at this intersection.

Figure 8: High Street at Old High Street

- **High Street at Powder Mill Road (Route 62):** The intersection of High Street and Powder Mill Road (see **Figure 9**) is a three-legged signalized intersection, with Powder Mill Road meeting High Street at the end of the RSA study area. Powder Mill Road is classified as an Urban Arterial roadway. The intersection is signalized for all approaches. The Powder Mill Road eastbound and westbound approaches both have one through lane and one left-turn lane to enter High Street. High Street approach to Powder Mill Road has one right-turn and one left-turn lane. Both streets have just one receiving lane. There are sidewalks on south side of Powder Mill Road which terminate at the crosswalk on Powder Mill Road located on the west leg of the intersection. There are sidewalks on the east side of High Street as well as a crosswalk on the northern leg of the intersection.

Figure 9: High Street at Powder Mill Road

Project Data

Crash Analysis

Crash records collected from the Acton Police Department and the Massachusetts Crash Data Portal reported a total of 80 crashes in along the study segment between 2015 and 2020 (see **Appendix A: Crash Summary Graphs** for full summary). Of the total, 15 (19%) were injury crashes. The most frequent types of crashes were single vehicle and angle crashes, representing 39% and 21% of the total collisions respectively. Of the single vehicle collisions, 55% involved a vehicle colliding with a fixed object. There was a higher occurrence of crashes just before typical afternoon peak hours (2PM – 4PM, 18% of all crashes) and just before midday (10AM – 12PM, 16% of all crashes). Most of the crashes happened in daylight (54%), with 21.3% occurring when it was dark. While most crashes occurred in clear weather conditions (46%), and on a dry road surface (51%), there were significant instances of crashes occurring in rainy/snowy conditions (24%) and on wet/snowy road surface (33%). Crashes were more prevalent in winter months of December, January, and February (14%, 11%, and 10%, respectively) and in July (10%). Crashes were also more prevalent on Tuesdays and Thursdays, accounting for 21%, and 18% of the total, respectively.

Figure 10 shows where the crash clusters are located within the corridor. Most of the collisions happened near Parker Street and Main Street intersections, representing 25% and 14%, respectively.

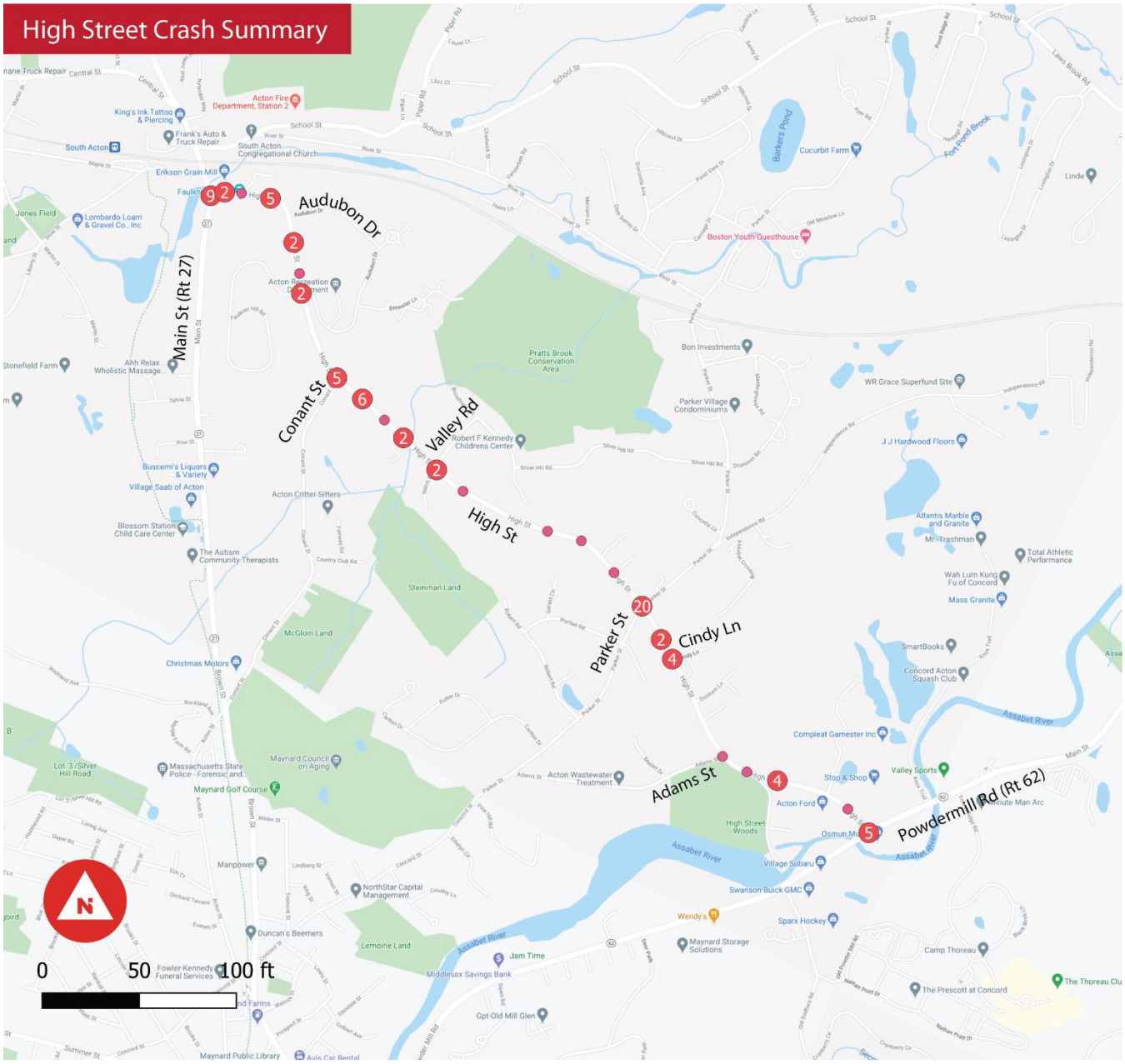

Figure 10: High Street crash locations

Road Safety Audit

Toole Design conducted the RSA on Tuesday January 11, 2021. The members of the audit team comprised of representatives from local and state agencies ranging from emergency responders to transportation planners and engineers. The audit team members and their affiliations are provided in **Table 1** and their contact information is provided in **Appendix B: RSA Audit Team Contact List.**

Table 1: Participating Audit Team Members

Audit Team Member	Agency/Affiliation
Corey York	DPW Director, Town of Acton
QinRui Pang	Engineer, Town of Acton
Carl Maria	Highway Department Superintendent, Town of Acton
David Martin	Acton Select Board member
Lauren Morton	Former Acton Select Board-person and Planning Board-person
Jim Snyder-Grant	Acton Select Board member
Christopher Prehl	Acton Police Department
Jim Cogan	Acton Police Department
David Loutzenheiser	Metropolitan Area Planning Council (MAPC)
Kristof Devastey	Toole Design Group
Sneha Adhikari	Toole Design Group

The audit was held virtually on a video conference call in order to comply with COVID-19 guidelines. During the audit, the team discussed safety concerns throughout the corridor, viewed videos of the segment and its operations, and discussed potential countermeasures to mitigate the identified safety issues. Audit team members received a meeting packet prior to the RSA which included study intersection details, crash data analysis of the study segment, videos of the segment, and a RSA prompt list (see **Appendix C: RSA Meeting Prompt List**). The audit members were asked to review the packet and visit the study segment prior to the meeting. Crash table, crash graphs and videos of the intersection were shown at the beginning of the RSA. Safety issues were then identified by the team and potential short-, medium- and long-term countermeasures for the safety issues were recommended by the various team members.

Public Feedback Forum

The Town of Acton and Toole Design hosted an online public forum on March 4, 2021 to solicit feedback from the Town residents on their concerns with High Street. In addition, an online survey was distributed through the Town website, asking residents about their level of comfort travelling through High Street in various modes and the concerns they have about the area. Approximately 267 people completed the survey which included 11% residents of High Street, 41% residents of an adjacent street, and 35% residents from another neighborhood in the area. Majority of the people (96%) noted personal vehicles as their selected mode of travel along High Street. Of those people, 38% and 19% also walk and bike, respectively, on High Street. See **Appendix D: Public Forum**

Survey and Results for the list of survey questions and summary of results (not including written comments which have been analyzed for the sections below).

Observations and Potential Safety Enhancements

The observations made by the RSA audit members and by the members from the public forum and survey are summarized in the sections below. The observations have been broken down into three categories based on the concerns most commonly cited throughout the High Street corridor:

- High Speed & Traffic
- Roadway Geometry
- Pedestrian & Bicycle Accommodations

Note that these categories do not constitute an exhaustive list of all the issues mentioned during the public survey but instead, capture issues that were the most commonly mentioned by respondents. Potential safety enhancements to address the observed issues are also included in the following sections.

Corridor-Wide

High Speed & Traffic

Observations

RSA Audit members and public forum respondents noted that speeding was a big issue throughout the corridor. The grade changes (uphill and downhill movements) and the road curvature were mentioned as one of the potential factors that attributed to speeding. Additionally, while High Street is primarily residential, there was a concern that people approaching High Street from Main Street and Powder Mill Road - both of which are streets with more commercial uses - may not realize that High Street is residential and that they need to slow down. The downhill segments of High Street were noted as locations where the speeding is highest. These segments are between Main Street and Conant Street, Conant Street to Valley Road, and on approach to Parker Street. It should be noted that these locations also coincide with the locations where the majority of the collisions occurred in the corridor (see **Figure 10**). Wet and icy conditions combined with speeding was also cited as being one of the reasons for the high proportion of single vehicles crashes (39%) in the corridor. Many people also voiced concerns over the amount of large trucks in the corridor and speeding behaviors from large trucks leading to unsafe conditions.

Potential safety enhancements

- Consider implementing traffic calming strategies distributed throughout the corridor to slow vehicle speeds. Options may include short medians, mini traffic circle at intersections, and speed humps (ensure that emergency vehicle access is not hindered).
- Consider adding entrance features at either ends of the High Street corridor that signals the street as residential. Median islands are one of the possible measures to achieve this.
- Consider removing the centerline at street segments (except at intersections). This measure has been shown to increase driver engagement which also leads to slower speeds. High visibility edge stripes can be added to ease concern of night blindness.
- Consider adding more speed feedback signage as interim improvement to inform people about the speed limit.
- At the Town's discretion, truck restrictions along High Street may also be explored.

Roadway Geometry & Visibility

Observations

One of the common corridor-wide issues brought up during the RSA and from public feedback was sight distance on all side streets, and on segments where the road curves. Many people also mentioned that there are a lot of residential driveways that are blind/have sightline issues - vehicles pulling out of the driveways may not see vehicles travelling on High Street and vice versa.

Potential safety enhancements

- Evaluate sight triangles at driveways, intersections, and horizontal and vertical curves along High Street
- Consider vegetation trimming and additional signage to caution drivers on approach to areas with difficult sightline.

Pedestrian & Bicycle Accommodations

Observations

The incomplete sidewalk or the gaps in the existing sidewalks was one of the main pedestrian issues mentioned by the audit members and the public. Some noted that during winter weather events, sidewalks are not cleared as frequently as they should be.

Potential safety enhancements

- Ensure that High Street sidewalks are completed without gaps.
- Consider increasing the frequency of snow clearing along the sidewalks.

High St/Main St (Route 27)

High Speed & Traffic

Observations

Comments from the audit members and the public note that traffic is often backed up on High Street on approach to Main Street during peak hours. Many people expressed the difficulty in being able to turn into Main Street from High Street and vice versa when traffic volumes are high. While it is recognized that operational issues are typically excluded from an RSA, it is also understood that the inability to effectively maneuver through the intersection poses a safety concern.

Potential safety enhancements

- Consider conducting a traffic study to understand vehicle queuing behavior
- Verify if existing conditions warrant the need of a traffic signal for these movements

Pedestrian & Bicycle Accommodations

Observations

Audit members and public feedback respondents noted that the crosswalk across Main Street (north leg of intersection) is unprotected with signage only. This crosswalk is significant as it serves as connection to the commuter rail station. The crossing can be dangerous during heavy traffic periods when cars are often focused on getting through the intersection and may not look for and stop for pedestrians who want to cross the street at the marked crosswalk.

Potential safety enhancements

- Consider installing flashing beacons/RRFBs at the crosswalk to enhance visibility of pedestrians.

High St/Audobon Dr/Faulkner Hill Rd

Roadway Geometry & Visibility

Observations

Audit members noted that Faulkner Hill Road had a stop sign which seems to have been taken down which adds to confusion for people looking to pull out to High Street. Additionally, sightlines exiting Faulkner Hill Road were noted to be limited.

Potential safety enhancements

- Explore installing a stop sign on Faulkner Hill Road.
- Evaluate sight triangles at this intersection.

Pedestrian & Bicycle Accommodations

Observations

Audit members and public feedback respondents noted that this intersection is popular for people walking and biking since it links to the Pratts Brook Conservation Area and is close to Main Street for commuter rail access. Many people mentioned increased vehicle speeds as vehicles come downhill making this intersection dangerous to cross.

Potential safety enhancements

- Consider implementing traffic calming measures including median islands and signage to reduce speeds through the intersection.
- Consider installing a crosswalk with flashing beacons/RRFBs. The installation of RRFBs should only be considered in conjunction with the aforementioned speed management/traffic calming measures.

High St/Conant St

Roadway Geometry & Visibility

Observations

Audit members and public feedback respondents expressed that due to limited sightline on Conant Street, vehicles often have to pull out a lot to see High Street putting them in danger from high speed vehicles on High Street. The guardrails installed in the southwest corner of the intersection was a typical collision location especially when roads are slippery. Collision data shows that there have been 3 crashes in the study period where vehicles have hit the guardrail.

Potential safety enhancements

- Evaluate sight triangles at this intersection.
- Consider adding signage and traffic calming measures to slow drivers on High Street.

High St/Valley Rd/Hatch Rd

Roadway Geometry & Visibility

Observations

Sightline issues at this intersection was a common concern brought up especially considering speeding vehicles on High Street.

Potential safety enhancements

- Evaluate sight triangles at this intersection.

- Consider adding signage and traffic calming measures to slow and caution drivers and reduce speed going through the intersection.

High St/Parker St

Roadway Geometry & Visibility

Observations

This intersection has the highest number of crashes (25% of total) in the corridor. Many people had specific concerns of visibility at this intersection due to overgrown vegetation. It was mentioned that drivers on Parker Street do not see the stop sign at this intersection and also not see cars travelling on High Street.

Potential safety enhancements

- Evaluate sight triangles at this intersection.
- Reevaluate the trimming schedule for vegetation at this intersection.
- Consider adding a mini traffic circle at this intersection.

Pedestrian & Bicycle Accommodations

Observations

While there is an existing crosswalk at this intersection, it was mentioned that drivers often do not see it or do not stop for pedestrians.

Potential safety enhancements

- Consider adding flashing beacons/RRFBs to enhance visibility of the crosswalk.

High St/Powder Mill Rd (Route 62)

Roadway Geometry & Visibility

Observations

Audit members noted that people driving may not see the traffic lights at this intersection which may have been the cause for a pattern of angle crashes at this intersection.

Potential safety enhancements

- Consider adding reflective back plates to the signals for improved visibility. It should be noted that a structural analysis may be necessary to check for any impacts to wind loading requirements.

Pedestrian & Bicycle Accommodations

Observations

Audit members observed that there is a sidewalk only on the east side of the intersection without access for people going to the car dealership on the west side.

Potential safety enhancements

- Explore the feasibility of providing sidewalks on both sides

Summary of Road Safety Audit

Based on observations and discussions, the RSA team and the public feedback informed the issues and potential enhancements that could improve safety along High Street between Main Street and Powder Mill Road in Acton, Massachusetts. The timeframe and costs are categorized below in **Table 2** and **Table 3**, respectively**.**

Table 2: Estimated Time Frame

Time Frame	
Short-Term	<1 Year
Mid-Term	1-3 Years
Long-Term	>3 Years

Table 3: Estimated Cost Breakdown

Costs	
Low	<$10,000
Medium	$10,001-$50,000
High	>$50,000

Table 4 to Table 9 lists each safety issue and the corresponding potential safety enhancements that were discussed at the audit and within the previous sections. The table includes the safety benefit, estimated timeframe for completion and estimated cost for each observed safety issue and potential safety enhancement. Safety payoff estimates are subjective and may be based on the relative percent of crashes that may be reduced by the enhancement based on known and documented crash reduction factors, if available or estimated crash reduction based on a stated source.

Table 4: Potential Safety Enhancement Summary: High Street (Corridor-Wide)

Safety Issue	Potential Safety Enhancement	Safety Payoff	Time Frame	Cost
High Speed & Traffic	*Consider implementing traffic calming strategies distributed throughout the corridor to slow vehicle speeds. Options may include short medians, mini traffic circle at intersections, and speed humps (ensure that emergency vehicle access is not hindered).*	High	Long-Term	High
	Consider adding entrance features at either ends of the High Street corridor that signals the street as residential. Median islands are one of the possible measures to achieve this.	High	Long-Term	Medium
	Consider removing the centerline at street segments (except at intersections). This measure has been shown to increase driver engagement which also leads to slower speeds. High visibility edge stripes can be added to ease concern of night blindness.	Medium	Long-Term	Medium
	Consider adding more speed feedback signage as interim improvement to inform people about the speed limit.	Medium	Short-Term	Low
	At the Town's discretion, truck restrictions along High Street may also be explored.	Low	Mid-Term	Medium
Roadway Geometry & Visibility	*Evaluate sight triangles at driveways, intersections, and horizontal and vertical curves along High Street*	High	Long-Term	Medium
	Consider vegetation trimming and additional signage to caution drivers on approach to areas with difficult sightline.	Medium	Short-Term	Low
Pedestrian & Bicycle Accommodations	*Ensure that High Street sidewalks are completed without gaps.*	High	Mid-term	High
	Consider increasing the frequency of snow clearing along the sidewalks.	High	Mid-term	Low

Table 5: Potential Safety Enhancement Summary: High St/Main St (Route 27)

Safety Issue	Potential Safety Enhancement	Safety Payoff	Time Frame	Cost
High Speed & Traffic	*Consider conducting a traffic study to understand vehicle queuing behavior*	High	Long-Term	High
	Verify if existing conditions warrant the need of a traffic signal for intersection movements	High	Long-Term	Medium
Pedestrian & Bicycle Accommodations	*Consider installing flashing beacons/RRFBs at the crosswalk to enhance visibility of pedestrians.*	Medium	Short-Term	Medium

Table 6: Potential Safety Enhancement Summary: High St/Audubon Dr/Faulkner Hill Rd

Safety Issue	Potential Safety Enhancement	Safety Payoff	Time Frame	Cost
Roadway Geometry & Visibility	*Explore installing a stop sign on Faulkner Hill Road*	Low	Short-Term	Low
	Evaluate sight triangles at this intersection.	High	Long-Term	Medium
Pedestrian & Bicycle Accommodations	*Consider implementing traffic calming measures including median islands and signage to reduce speeds through the intersection*	High	Long-Term	Medium
	Consider installing a crosswalk with flashing beacons/RRFBs. The installation of RRFBs should only be considered in conjunction with the aforementioned speed management/traffic calming measures.	Medium	Short-Term	Low

Table 7: Potential Safety Enhancement Summary: High St/Conant St

Safety Issue	Potential Safety Enhancement	Safety Payoff	Time Frame	Cost
Roadway Geometry & Visibility	*Evaluate sight triangles at this intersection*	High	Long-Term	Medium
	Consider adding signage and traffic calming measures to slow and caution drivers and reduce speed going through the intersection	High	Long-Term	Medium

Table 8: Potential Safety Enhancement Summary: High St/Parker St

Safety Issue	Potential Safety Enhancement	Safety Payoff	Time Frame	Cost
Roadway Geometry & Visibility	*Evaluate sight triangles at this intersection*	High	Long-Term	Medium
	Reevaluate the trimming schedule for vegetation at this intersection	Medium	Short-Term	Low
	Consider adding a mini traffic circle at this intersection	High	Mid-Term	Medium
Pedestrian & Bicycle Accommodations	*Consider adding flashing beacons/RRFBs to enhance visibility of the crosswalk*	Medium	Short-Term	Low

Table 9: Potential Safety Enhancement Summary: High St/Powder Mill Rd

Safety Issue	Potential Safety Enhancement	Safety Payoff	Time Frame	Cost
Roadway Geometry & Visibility	*Consider adding reflective back plates to the signals for improved visibility. It should be noted that a structural analysis may be necessary to check for any impacts to wind loading requirements*	Low	Short-Term	Low
Pedestrian & Bicycle Accommodations	*Explore the feasibility of providing sidewalks on both sides of High Street*	Medium	Long-Term	High

Appendix A: Crash Summary Graphs

Appendix B: RSA Audit Team Contact List

Invited Audit Members

Audit Team Member	Agency/Affiliation	Email Address
Corey York	DPW Director, Town of Acton	cyork@acton-ma.gov
QinRui Pang	Engineer, Town of Acton	qpang@acton-ma.gov
Carl Maria	Highway Department Superintendent, Town of Acton	cmaria@acton-ma.gov
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Lauren Morton	Former Acton Select Board-person and Planning Board-person	lsr57@comcast.net
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Jim Cogan	Acton Police Department	jcogan@acton-ma.gov
David Loutzenheiser	Metropolitan Area Planning Council	DLoutzenheiser@mapc.org
Kristof Devastey	Toole Design Group	kdevastey@tooledesign.com
Sneha Adhikari	Toole Design Group	sadhikari@tooledesign.com

Appendix C: RSA Meeting Prompt List

Appendix D: Public Forum Survey and Results